Utility MACT for Coal- and Oil-Fired Electric Utility Boilers

Recommendations by:

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Submitted September 9, 2002 (revised September 20, 2002)

MERCURY MACT FOR COAL-FIRED ELECTRIC GENERATING UNITS

A. Subcategories

Recommendation: Three "boiler type" subcategories are recommended: fluidized bed combustors, conventional boilers, and coal gasification.

Rationale: Based on the information provided to the Utility Working Group there appears justification for treating conventional boilers differently than fluidized bed combustors and coal gasification units because they are uniquely different systems.

Other subcategories are not appropriate, especially subcategorizing by fuel type, because fuel type does not represent a "class, type or size" distinction, as defined under Section 112 of the Clean Air Act.

B. Emission standards

a. New sources

Recommendation: We recommend that for new sources, the MACT for mercury should reflect the best performing unit in each boiler type subcategory, except for coal gasification units. For these units, given that cost-effective technology is commercially available and has been demonstrated in industrial applications, a 95% control level or greater for these units is appropriate.

b. Existing sources

Recommendation: We recommend an output based emission rate standard, calculated using the following input based rates for each of the proposed boiler type subcategories and the boilers' specific heat rates efficiencies:

FBC boilers (averaged over 4 units—the 5th unit	0.19 lbs/TBtu

appears to be an outlier and thus should not be included)	
Conventional boilers (averaged over 7 units)	0.21 lbs/TBtu
Coal gasification (beyond-the-floor)	.27 lbs/TBtu (95% control)

Rationale for emissions standards for FBC and coal gasification units*:* For fluidized bed combustors, four of the five "MACT-floor" units measured mercury emissions ranging from 0.08 to 0.46 lbs/TBtu; the fifth unit measured emissions at 3.97 lbs/TBtu (it was equipped with a CS-ESP whereas all the other units had baghouses installed.). Setting a standard at 0.95 lbs/TBtu (the average over the five FBC units measured) would not have the desired effect that a MACT standard should have: It would allow more mercury to be emitted than is currently measured at existing units. For this reason, a standard more stringent than the 0.95 lbs/TBtu would be appropriate. Averaging the emissions over the top four units would be one possibility, which would result in a MACT floor of 0.19 lbs/TBtu, or 92% reduction.

For coal gasification units, demonstrated cost-effective technology is commercially available that would allow these units to get significant mercury reductions. Carbon filter beds for metals cleanup from syngas have already been demonstrated on industrial gasification units. In addition, the U.S. Department of Energy has already completed an engineering analysis for installation of a carbon filter bed at Tampa Electric's Polk Station that would achieve a 99% mercury removal at a very reasonable cost. A 95% beyond the floor control level for coal gasification units is appropriate given the likely ease with which units can meet this level. New integrated gasification combined cycle units are being proposed and far more are likely in the future. Thus, without a mercury emission standard, this will be a source category of increasing concern with respect to mercury emissions.

D. Format of Standard

a. Input versus output

Recommendation: We recommend an output-based standard (lbs/MWh) using net generation as reported to EIA Form 767.

Rationale: An output-based standard rewards efficiency and provides utilities with compliance flexibility by adding efficiency to the mix of ways to meet an emission limit. Given that current boilers operate, on average, at 30% efficiency significant gains can be made if the Agency takes steps to promote increased efficiency through establishment of output based emissions standards. For example, analyses completed by DOE found plants that raised their heat rates from 30% to 36% increased their efficiency by 20%. An output based standard also most closely reflects the spirit of Sec. 112, where it was Congress' intent to establish a toxics regulatory program that encouraged investment in compliance

methods in addition to stack controls, including process changes, work practice standards, etc., to meet a new emission limit.

b. Percent reduction versus emission rate versus both

Recommendation: We recommend the use of an output-based emission rate that would apply to each category/subcategory of units.

Rationale: We believe that output-based standards promote efficiency, as described above. In addition, setting an output-based emission rate takes into consideration already installed equipment that captures mercury; and lends itself to more reliable and less burdensome compliance monitoring than what would be required through alternate approaches like percent removal (which would require a combination of coal sampling and stack testing, raising verification/accuracy issues).

Not only would compliance monitoring be more difficult under a percent reduction standard, it would also be more burdensome to industry, thereby potentially discouraging coal blending or switching as a control option. This is a crucial consideration given that historically power producers have relied heavily on fuel switching as a cost effective regulatory compliance strategy.

c. Alternate EITHER/OR standard:

Recommendation: We recommend *against* an either/or approach (i.e., the facility chooses whether to meet an emission rate or a percent reduction requirement). .

Rationale: Our analysis of the ICR data shows that the percent reduction approach is always less stringent than the emission rate approach (this holds true for nearly every power plant) for bituminous and subbituminous coals. For lignite coals, under the top 12% scenario there are a few power plants where the emission rate (4.01 lb./Tbtu) is less stringent than a percent reduction scenario (70%). This is because they already are achieving an emission rate lower than 4.01 lb/Tbtu. In these instances, the plants would actually be allowed to emit more than they are emitting now.

If EPA is inclined to promulgate an either/or standard, it should consider appropriately stringent targets to avoid this effect.

E. Averaging period

Recommendation: We recommend using a 30-day averaging period to take into account variability that has been measured in stack tests.

Rationale: A 30-day averaging period addresses the inherent variability found in mercury flue gas. EPRI's April 14, 2002 presentation on the initial results of its SCEM data showed that as averaging times increased (from hourly to daily and then over several days), variability decreased. The 30-day averaging period will provide facilities an even longer timeframe over which to meet the emission rate.

F. Compliance monitoring method(s)

Recommendation: We recommend the use of continuous emissions monitors (CEMs) for mercury.

Rationale: It is the most accurate method for measuring stack emissions, and given the variability that has been observed through short term stack tests, and the verification/accuracy issues observed while using combined coal sampling and stack testing (to measure % reduction), CEM's are the best tool.

Several mercury CEMs already are commercially available. A project underway at EPRI uses a mercury CEM that takes measurements at 2.5 minute intervals. While there are some technical issues that need to be worked out (specifically the issue re: frequent oversight to ensure that the equipment is functioning properly) the compliance deadline of December 2007 gives manufacturers ample time to perfect the technology and to develop several CEM options for the industry.

MACT FOR NON-MERCURY HAZARDOUS AIR POLLUTANTS FOR COAL- AND OIL-FIRED ELECTRIC GENERATING UNITS.

A. Emission Standards

We firmly believe that EPA has a clear statutory duty to set emission standards for all of the non-mercury HAPs emitted from coal- and oil-fired power plants.

Recommendation: If the Agency finds that the data are inadequate for the purpose of fulfilling its statutory duty of setting standards for all of the non-mercury HAPs, we recommend that EPA immediately initiate efforts to gather additional data, using its authority under section 114 of the Act or through other means (e.g., state emissions tests data), in order to meet its legal requirement.

Rationale*:* EPA's December 20, 2000 Notice of Regulatory Finding, 65 Fed. Reg. 79825 (Dec. 20, 2000), had the legal effect of listing coal- and oil-fired electric steam generating units as a source category under section 112(c). See *UARG v. EPA*, No. 01-1074, (D.C. Cir. July 26, 2001)(order dismissing industry's challenge to the Notice of Regulatory Finding, on the grounds that "judicial review of the listing of a source category under section 112(c) of the Act is not available until after emission standards are issued.") The listing of these electric generating units had the legal effect of triggering the requirement in section 112(c)(5) of the Act that "emissions standards under [section 112(d)] for the category or subcategory shall be promulgated . . . " Section 112(d) requires that regulation of all HAPs is required for each listed category or subcategory of major

sources. The D.C. Circuit further held, in *National Lime Ass'n v. EPA*, 233 F.3d 625, 634 (D.C. Cir. 2000), that section 112(d) defines a "clear statutory obligation" on the part of EPA, "to set emission standards" for all the HAPs listed in the statute at section 112(b), for the enumerated major source categories.

B. MACT Floor for Existing Sources

Currently, we do not have recommendations for specific MACT floor levels for pollutants other than non-mercury metals emitted by coal-fired electric generating units. Similarly, we do not have recommendations for MACT floor levels for pollutants other than nickel emitted by oil-fired electric generating units.

Recommendation: We believe that the available stack test data are sufficient to support a floor for 'non-mercury HAP metals' emitted by coal fired units and recommend that the Agency use these data to set emission standards for all of the non-mercury HAP metals.

A floor for the non-mercury HAP metals emitted by coal-fired units is represented by the average of the best performing 12 percent of the 30 power plants tested. Based on these data we recommend a MACT floor in the form of an output-based emission rate that would reflect a 99 percent removal for all metals (or each non-mercury HAP metals groups. See section D.b. below for a discussion of an alternate surrogate approach). Alternatively, an emission rate could also be set for each individual metal based on measured stack test data. The table below lists the input-based emission rates that represent the average of the best performing 12 percent for the tested units from which an output-based standard can be calculated.

Metal	Emission Rate (lb/Trillion Btu)
Antimony	0.15
Arsenic	0.24
Barium	1.34
Beryllium	0.01
Cadmium	0.16
Chromium	0.91
Cobalt	0.19
Copper	1.3
Lead Compounds	0.34
Manganese	2.38
Molybdenum	0.61
Nickel	1.34
Selenium	0.19
Vanadium	0.58

For oil fired units, set a MACT floor for nickel emitted by those units.

About 90 facilities burn 100% oil. With 12 data points, we have data for about 13% of the facilities. The top 12% of the facilities for which we have data would result in a standard derived from the top 2 facilities**.** Thus, the standard would be based on the average of the top 2 facilities (1.60 and 50.50 lbs/trillion Btu). The MACT standard would be 26.05 lbs/tBtu.

If EPA determines that the emissions data from the top performing facility should not be used to calculate the floor because it is a pilot test, the standard would be the average of top second and third performers (50.50 and 238.00 lbs/tBtu). The MACT standard would be 144 lbs/tBtu.

C. MACT Floor for New Sources

Recommendation*:* For new sources, the MACT floor for the non-mercury HAPs should reflect the best performing unit.

D. Format of the Standard

a. Input v. output

Recommendation*:* We prefer an output-based standard and recommend exploring the feasibility of establishing such a standard for the non-mercury HAPs (or groups of non-mercury HAPs). We further recommend the use of a nickel output-based standard for oil-fired units.

Rationale: An output-based standard rewards efficiency which in the case of electric generating units, can play a significant role in determining a unit's emissions in relation to its electricity generation. Improving efficiency should be a compliance option, much like burning alternate fuels or installing control devices. Only through issuance of an output-based standard will this more likely be the case.

b. Alternate Surrogate Standard

We understand that in previous rulemakings the Agency has chosen to group pollutants and establish surrogate measures as an alternate approach to setting individual emission rates. A surrogate approach to regulating non-mercury HAPs could also be acceptable, but only if it can be shown that the surrogate measure reflects the actual emissions of the represented pollutants, and the surrogate emission rate represents the calculated floor. In addition, any surrogate would, at a minimum have to have substantially the same properties as the grouped pollutants and be controlled by the same mechanism or measures. Controls could include feed rate or type of coal as well as control technologies.

Recommendation*:* If a surrogate approach is taken we recommend that the non-mercury HAP metals be grouped into two categories for the purpose of setting a MACT floor: a 'low-volatility HAP metals' category and also a 'semi-volatile HAP metals' category. The 'low-volatility HAP metals' group includes antimony, barium, beryllium, chromium,

cobalt, copper, manganese, molybdenum, nickel, vanadium. The 'semi-volatile HAP metals' group includes lead compounds, cadmium, arsenic and selenium.

In theory, other groupings of non-Hg HAPs make sense, based on the similar properties within the group. These groupings could include 'Acid Gases', 'Radionuclides,' 'Organics other than dioxins/furans,' and 'Dioxins/Furans.' For acid gases, we believe that additional data must currently be available. For example, there are emission factors for HCl and HF that are used to calculate acid gas emissions for the purpose of reporting to the Toxics Release Inventory. These emission factors required the development of an underlying dataset that could be made available to EPA. We urge EPA to take all necessary steps required for the control of acid gas emissions.

c. Alternate Emission Rate/ Percent Reduction Standard

An 'either/or' standard may be appropriate if appropriately stringent targets are set. The concerns noted above relating to the either/or form of the mercury standard would also pertain to the non-Hg HAPs (or its surrogates).

d. Averaging Period

Recommendation: We recommend a 30-day averaging period for the non-mercury HAPs emitted by coal-fired units, to be consistent with the averaging period for mercury.

For oil-fired units, each unit would be required to meet the floor over a quarterly averaging period.

Rationale for oil-fired units: There is high variability in the data set from the small number of data points and seasonal variation in oil use. Providing facilities a long compliance period allows them flexibility in dealing with variability and in finding cost effective ways to comply with the standard. Although utilities may prefer an annual averaging period, such a long time period is not necessary as long as facilities have the ability to burn less oil as a compliance option. This approach, unlike a tonnage cap, does not rely on historical data on oil use to establish a standard, which may not be indicative of future use.

E. Compliance Monitoring Method

Recommendation*:* In the case of individual emission standards for the non-mercury HAPs emitted by coal-fired units, we recommend that EPA devise a monitoring system of sufficient frequency to ensure compliance with the standard.

If a surrogate approach is taken, we recommend continuous emission monitoring of the surrogate pollutant (e.g., SO2 for the acid gases). In addition, to ensure that the surrogate reflects each individual HAP emission rate (or percent reduction, depending on the format of the standard), a periodic compliance test should be required (at least semi-annually) during which each pollutant should be measured as well as the surrogate so there are data for a direct comparison.

For oil-fired units:

a. where no particulate controls are in place: (1) analyze monthly composite sample of oil; (2) determine annual weighted average based on rolling12 months; and (3) weight average by amount of oil used each month.

b. where particulate controls are in place: In addition to the oil sampling, (1) do annual testing of control device to determine metal removal efficiency, and (2) apply that efficiency factor to the metal emission rate as determined.